

Curriculum Vitae

A. Thomas Waytes, M.D., Ph.D.

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Personal Information:

- Born 25 March 1953, Dearborn, MI
- United States Citizen
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Education:

- Aug. 1974 BS (Experimental Biology) University of Michigan-Dearborn
- May 1982 Ph.D. (Immunology - Noel R. Rose, MD, Ph.D., dissertation advisor)
Wayne State University School of Medicine, Detroit, MI
- June 1984 M.D. Wayne State University School of Medicine, Detroit, MI
- 1989 - 1991 Foundation for Advanced Education in the Sciences, NIH, Bethesda, MD,
Graduate School courses:
- Allergy and Clinical Immunology
 - Recombinant DNA Methodology
 - Cellular and Molecular Approaches to Clinical Laboratory Diagnosis
- April 1997 J.L. Kellogg Graduate School of Management, Northwestern Univ.,
Evanston, IL - Finance for Executives.

Current Position:

- Vice President, Medical and Scientific Affairs, biopharmaceutical company

Certifications:

Diplomate, National Board of Medical Examiners, 1 July 1985

Diplomate, American Board of Internal Medicine, 16 Sept. 1987

Diplomate, American Board of Allergy and Immunology, 3 Oct. 1989
Recertification, 1997, 2005

Certification in Diagnostic Laboratory Immunology, American Board of Allergy
and Immunology, 1 Oct. 1990

Licensed by the Michigan Board of Medicine

Training/Experience:

- 1984 - 1987 Resident, Internal Medicine, William Beaumont Hospital,
Royal Oak, MI
- 1987 - 1991 Medical Staff Fellow, Allergy and Immunology, National
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Research directed by Michael M. Frank, MD
- 1989 - 1991 Contributing Editor, Allergy, Asthma and Immunology
Guide - Core Series
- 1990 - 1991 Senior Medical Staff, National Institute of Allergy and Infectious
Disease, NIH Clinical Center, Bethesda, MD
- 1992 – 2000 Clinical Assistant Professor, Wayne State University School of Medicine
- 1995 - 1997 Vice President, Medical Affairs, IMMUNO-U.S., Inc.
- 1998 – 2000 Vice President, Medical Affairs and Quality Operations, and Responsible
Head, Community Bio-Resources, Inc., Hyland Immuno Division of
Baxter Healthcare
- 2000 – Cur. Vice President, Medical and Scientific Affairs, BioPort Corporation

Professional Society Memberships:

- American Academy of Allergy, Asthma, and Immunology (Fellow)
- American Medical Association
- Michigan State Medical Society
- Ingham County Medical Society

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Statement Presented - Joint Hearing on May 9, 2006

Before:

Senate, Natural Resources & Environmental Affairs Committee
House, Natural Resources, Great Lakes, Land Use, and Environment Committee

By
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I have been asked by representatives of Save Our Shoreline (SOS) to advise them on potential health issues associated with residing near, or coming into contact with, the small pools of stagnant water that have resulted from the receding Great Lakes water levels. I have also been asked to conduct a review of the MDEQ report, "Report on the Impacts of Beach Maintenance and removal of Vegetation under Public Act 14 of 2003".

My background is that of a physician and a scientist. I received both PhD and MD degrees at Wayne State University School of Medicine in Detroit. I also consider myself to be an environmentalist, and have supported and been active in a number of groups dedicated to the preservation of wildlife habitat.

I will divide my statement into two sections: A) An Assessment of Potential Adverse Health Impacts Associated with Small Stagnant Pools of Water, and B) Assessment of DEQ Studies Regarding Beach Maintenance.

A) Adverse Health Impacts Associated with Small Stagnant Pools of Water

One result of the receding water levels of the Great Lakes is the formation of small, shallow, stagnant pools of water above the shoreline. Because these pools typically lie shoreward of the small beach ridges created by wave action, they only intermittently communicate with the fresh water of the lakes – typically during storms and other periods associated with high waves. As such, these shallow pools fill with decaying vegetative matter, the stench of which is often noted in nearby residential areas. These pools of stagnant water may also potentially serve as incubators for organisms, or vectors of organisms, that may cause human disease. These include a multitude of potentially fatal viral diseases, spread by mosquitoes, as well as other diseases caused by direct exposure to bacteria and parasites. In addition, they attract domestic and wild animals that defecate and urinate in and around them. Dead animals have been described decomposing in them. Because of their relatively warm temperature, their shallowness, and their closeness to houses along the beach, these pools unfortunately are often used by young children to play in, thus potentially exposing themselves to a myriad of pathogenic organisms.

Of particular concern are the mosquito-borne viruses that can cause inflammation of the brain (encephalitis) and/or the membrane surrounding the brain (meningitis). The encephalitis virus receiving the most attention recently is the West Nile Virus (WNV), which appeared in New York City in 1999, and has spread westward. WNV appeared in Michigan in 2001, and the first human case in Michigan was in 2002. Since that time, there have been over 700 documented cases of WNV in Michigan, 57 of which were fatal. In 2005, there were 62 human cases of WNV in Michigan, most occurring in counties bordering Great Lakes waterways. It is likely that there have been many more unrecognized cases.

The WNV infection may cause mild illness, or no illness at all. Some individuals, however, develop high fever and severe neurological symptoms, such as stupor,

disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These may at times become permanent or lead to death. There is no specific treatment available for WNV, and there is currently no licensed human vaccine.

WNV almost always is transmitted through the bite of an infected mosquito. Mosquitoes usually get infected when they feed on infected birds, and can then spread WNV to humans and other animals when they bite. In a very small number of cases, WNV has also been spread through blood transfusions, organ transplants, breastfeeding and during pregnancy from mother to baby.

Other mosquito-borne encephalitis viruses include La Crosse (LAC) encephalitis, eastern equine encephalitis (EEE), western equine encephalitis (WEE) and St. Louis Encephalitis (SLE). Although rare, all have been known to cause human disease in Michigan. While some are more likely to cause severe neurological disease in children, others cause more severe disease in older adults.

The key to preventing these diseases is to avoid being bitten by infected mosquitoes. Mosquito control can sometimes be achieved through the use of pesticides. A more environmentally responsible alternative is the elimination of small pools of stagnant water, which are known to be ideal mosquito breeding grounds. The Centers for Disease Control and Prevention (CDC) and the Michigan Department of Public Health both list the removal of mosquito breeding sites as a key measure in preventing West Nile Virus infection.

Described above are potentially serious diseases spread by insects that breed in stagnant pools of water, then subsequently bite humans residing in the surrounding areas. Another potential health threat concerns illnesses acquired from swallowing, breathing, or coming into direct contact with contaminated water through recreational activities such as swimming or wading. These are often referred to as "recreational water illness", or RWI. Organisms that cause RWI include bacteria, viruses and parasites. For the reasons cited above, the warm, shallow, stagnant pools of water that have formed along some areas of the Great Lakes shoreline may potentially serve as incubators for organisms that may cause human disease, several of which are described below.

Among the key bacterial diseases of concern is leptospirosis, which is usually caused by exposure to water contaminated with the urine of infected animals, including dogs, rodents and wild animals. Recreational activities such as swimming or wading in contaminated water have been associated with infection with this organism. Some infected people have no symptoms at all. Others may develop high fever and chills, severe headache, muscle aches, abdominal pain, jaundice, and rash. If not adequately treated, the patient could develop kidney and/or liver failure, meningitis, and/or respiratory distress. Rarely, death may occur.

Other bacterial diseases associated with contaminated water (often associated with human contamination) include gastrointestinal disease caused by organisms such as *Shigella* and

E. coli. Although these diarrheal diseases are usually self-limited, infection with one strain of *E. coli*, O157:H7, can rarely lead to kidney failure in children.

A number of parasites can cause RWI. Among these is *Cryptosporidium*, or “Crypto”. Crypto can be caused by swallowing water contaminated by stool from infected humans or animals, and typically causes diarrhea, which can last for weeks. Another parasite of concern is *Giardia*. Like Crypto, illness from *Giardia* can be caused by swallowing water contaminated by stool from infected humans or animals, and typically causes diarrhea, which can last for several weeks. Relatively small exposures of either Crypto or *Giardia* can cause disease, which may be more serious in children, the elderly, or pregnant women. People with weakened immune systems, such as some cancer and transplant patients and persons with HIV/AIDS are at a higher risk for more serious or even life-threatening disease.

Organisms encountered in contaminated water may also cause skin disease. A parasite is responsible for causing cercarial dermatitis, or “swimmers itch”. Eggs of the organism enter water through the feces of infected waterfowl (ducks, geese, gulls) or some aquatic mammals. When the eggs hatch into larvae, they infect aquatic snails. The snails, in turn, release a more mature form of larvae, which can infect birds/mammals that they come into contact with. If these larvae come into contact with humans, they can burrow under the skin and die. This causes a reaction that results in the development of small pimples and blisters, and may itch intensely. Bacteria present in contaminated water may also enter through breaks in the skin and cause local infections.

In summary, small stagnant pools of potentially contaminated water, particularly near inhabited areas with extensive outdoor recreational activity, pose an unnecessary and preventable health risk to people living nearby. Such small pools often develop in coastal areas, just above the shoreline. Because of their location, their warmth, and their shallow nature, these pools tend to attract birds, mammals and insects – and the diseases that they may carry. These same features make the pools attractive for wading and splashing – particularly by small children, thus maximizing the opportunity for contact with the infectious organisms. Although the likelihood of developing a serious disease from activities in and around these pools is remote, there is no reason whatsoever to take this chance when it can be avoided. Common sense dictates that Michigan residents should not be forced to live and play near these areas.

Particularly on the eastern shores of the Great Lakes, where strong wave action continuously shifts the sand, there is no long-lasting environmental value to these stagnant pools that would preclude draining or filling them in when warranted. These are not the long-term, fresh water wetland areas that are important to the Great Lake ecosystem.

B. Assessment of DEQ Studies Regarding Beach Maintenance

Overall:

Not being a limnologist, I will grant the assumption that, during the execution of these studies, all measurements were performed accurately, and flora and fauna identified correctly. Having said this, I do find serious problems, however, with the scientific design, the non-elimination of potential observational bias, and the fact that the conclusions are often not supported by the scientific data generated. The study sometimes reads as if the conclusions were developed first, followed by attempts to obtain data that support them.

“Report on the Impacts of Beach Maintenance and Removal of Vegetation under Act 14 of 2003”, Michigan DEQ, March, 2006.

The authors set out to demonstrate that “Beach Maintenance Activities”, as allowed under PA 14, can have a detrimental effect on the Great Lakes environment. A scientifically appropriate manner in which to study the ecological impact of vegetation removal and beach maintenance activities would be to perform surveys and sampling in affected areas prior to, and then after, activities allowed under PA 14 took place. The authors did not follow this scientifically sound approach. Instead, they chose to select for comparison, in a non-random manner, sampling areas representing non-altered (“reference”) sites as well as sites allegedly representing the impact of vegetation removal or beach management. This non-random selection certainly created an opportunity for significant bias. In other words, persons experienced in aquatic ecology could easily “cherry-pick” areas that would likely demonstrate the differences that would support pre-determined conclusions or opinions.

The report also tends to confuse the environmental impact of activities allowed under PA 14 with those that were not allowed under this act. For example, PA 14 allows for vegetation removal in areas *above the water's edge*. The bulk of the environmental changes discussed in this report, however, result from the removal of vegetation into marshes extending well beyond the shoreline, at times 150 feet or more. Such activities (e.g., cutting a boat channel through a marsh) have nothing to do with activities allowed under PA 14, and attempting to make such a leap has no scientific basis whatsoever.

According to the report, “The Impacts of Various Types of Vegetation Removal on Great Lakes Coastal Wetlands of Saginaw Bay and Grand Traverse Bay”, by D. Albert (below), much of the area along the eastern shore of Saginaw Bay is an open shoreline area, where there is erosive wave action to the extent that, even in low-water periods, the temporary wetlands have little or no vegetation extending into the open water. When vegetation does extend into the open water, it is often in the form of *Phragmites*, a particularly aggressive non-native species that has been successfully competing with native species. Figure 11 demonstrates an example of “paired reference and groomed sites”, but does not mention the fact that the “reference” site is composed primarily of *Phragmites*. In addition, I could find no mention of the comparative sampling results of these two areas. An area resident informed me that at the time the sampling was being conducted, he was

told by the researchers that they detected no appreciable differences between these two areas.

Conclusions are drawn that are not supported by data from the studies contained in Attachments A and B. For example the data obtained did not support the contention that wetland alteration resulted in more rapid erosion of coastal sediments, as was claimed on page 18.

Comments specific to Attachment A, “The Effects of Coastal Wetland Fragmentation on Fish and Invertebrate Communities”, by D. Uzarski, et.al., 2005.

There was no good explanation as to how the reference sites and managed sites were always chosen. It seems, at times, that marsh areas were chosen as reference and non-marsh (with evidence of “on-shore” beach maintenance) chosen as comparative areas, however there was no explanation given as to whether the beach grooming activities had anything to do with the presence or absence of a marsh extending into the lake. Other factors such as wave action could have been major contributors to this difference – and to the results of the study. It is difficult to imagine how mowing and raking activities up on the shore could impact on the development of marshes 150 feet off shore. There was also no attempt to distinguish marshes of native species v. those of invasive species, such as *phragmites*. Because specific attempts are being made to remove this invasive and destructive species, marsh areas consisting primarily of *phragmites* should have been removed from the study analysis.

In determining the effects of wetland fragmentation, the authors included 19 wetlands fragmented by creating boat channels – an activity that is not allowed in PA 14. This serves only to confuse attempts to draw sound conclusions regarding the impact of mowing and raking on the surrounding aquatic environment. All data obtained from areas impacted by activities *not* defined in PA 14 should have been removed from the study analysis.

The sampling locations should be mapped out and compared to those identified in the study described in Attachment B. An explanation should be given as to why sampling areas appeared to be different. The term “open water raking” needs to be better defined. If this was truly an activity performed within the open water, it was not allowed in PA 14, and these areas should have been removed from the study analysis.

The presentation of data is not consistent. For example, Figure 21 clearly shows that mowing does not effect the invertebrate taxa richness and Shannon diversity, as compared to reference areas. Data representing the raked areas should not have been omitted. Other figures are difficult to interpret and should either be simplified or better explained so that the target audience (the general public and legislative body) can interpret them, and draw its own conclusions. Likewise, the aquatic environmental terminology (e.g., *Scirpus*, *Juncus*, *Typha*) should either be defined or simplified. The

data presented in Tables 5 – 10, do not contain adequate data to support study conclusions.

Of interest, despite the above procedural concerns, the Chemical and Physical Measurement data obtained support the fact that water quality at raked or mowed sites was similar to that of reference sites.

In summary, the study presented in Attachment A was written in such a way as to confuse and overwhelm the lay-reader instead of educate. Instead of stating the results in a clear and understandable way, and offering an interpretation later in the text – as is done in most scientific studies, the authors chose to repeatedly mix hypotheses and conjecture with the study data.

Comments specific to Attachment B, “The Impacts of Various Types of Vegetation Removal on Great Lakes Coastal Wetlands of Saginaw Bay and Grand Traverse Bay”, D. Albert, September, 2005.

This was an extensive two-year study, during which the author and his team compared vegetation in undisturbed areas around Saginaw and Grand Traverse Bays with those areas that have been “managed” by grooming activities such as mowing, raking and filling. Not surprisingly, the author and his team correctly established the fact that these activities can substantially change the type and density of vegetation in the immediate area in which the activity took place. A similar conclusion could be drawn every time a person cuts his or her lawn or plants a backyard garden, i.e., disturbing the ground in any way, shape or fashion can be expected to impact the species and numbers of plants that grow there. It is worth noting that these activities took place up on the shore, and not in areas within the Great Lakes themselves.

The observed decrease in the variety and amount of plant life in the immediate areas in which the activities took place, were consistent across vegetation types. Not only were there more desired species (e.g., bulrush) in the non-managed areas, there were also more of the “exotic species” (undesirable plants indicative of wetland degradation). Furthermore, the study text indicates that non-managed areas had larger amounts of *Phragmites*, a particularly aggressive non-native species that has been successfully competing with native species, than did areas that were raked, hand-pulled or filled. Comparative data for this specific species, however, was not shown.

Importantly, the author was not able to demonstrate that any environmental changes took place beyond those specific areas that were “managed” (mowed, raked, filled, etc.). The author could not verify that these activities resulted in more rapid erosion of costal sediments, as some have claimed. It is worth noting that the majority of the study sampling locations were along the eastern shore of Saginaw Bay. The author concedes that much of this area is an open shoreline area, where there is erosive wave action to the extent that, even in low-water periods, the temporary wetlands have little or no vegetation extending into the open water. During high-water periods, wave action rapidly erodes

away any small shoreline beach ridges and nearby swales. These conclusions were consistent with historical data obtained from long-time residents in the area, as well as long-term staff at Sleeper State Park.

In summary, the study in Attachment B supported what has been obvious to beach property owners for years. When lake levels recede, a variety of plants (native, "exotic", and invasive) can grow on the newly exposed area – typically separated from the shoreline by a small ridge. Raking, hand-pulling, filling or mowing can obviously eliminate these plants or change their composition. The long-term effect of this is moot, since the wave action of the water as it returns to its high-water levels shifts the sand and the plants are eliminated. Thus, this study supports the contention that during periods of low water levels, most owners of shoreline property can maintain the esthetic nature of their property and/or reduce the risk of potential health hazards through grooming activities, and that these activities have no appreciable long-term impact on the environment.

Conclusion:

In my preliminary analysis of the "Report on the Impacts of Beach Maintenance and Removal of Vegetation under Act 14 of 2003", I have come to the conclusion that it falls far short of the requirement in PA 14, which directs the MDEQ to prepare and submit a report that evaluates the activities allowed under the Act, and to describe the impacts to the affected areas. I could find no objective data in these studies that would lead me to conclude that beach grooming activities, as allowed by PA 14, resulted in a detrimental effect on the adjacent aquatic environment. The biased site-selection process, the inclusion of activities not specifically allowed under PA 14, and the missing and confusing presentation of data all combine to make it impossible to draw any conclusions regarding the environmental impact of these activities. I agree that further studies, performed under strict scientific rigor and presented in an objective and understandable manner are warranted.

Tom Waytes, MD, PhD